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E-SYSTEMS
Montek Division

Report No. 131500-612
12 August 1977

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**HIGH TEMPERATURE TEST REPORT
FOR THE
AN/TRN-41 TACAN NAVIGATIONAL SET**

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18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) AN/TRN-41 TACAN Navigational Set		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) This report describes the high temperature test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41. ↑		

HIGH TEMPERATURE TEST REPORT

for the

NAVIGATIONAL SET, TACAN, AN/TRN-41

This report describes the high temperature test as defined in the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41, 131500-415.

1. **Test Identification.** High Temperature test as defined in Appendix IV-B (high temperature test procedure) of the Equipment Test Plan for Navigational Set, TACAN, AN/TRN-41.

2. **Functional Purpose of Test.** This test forms a part of the AN/TRN-41 system qualification tests.

3. **Test Objectives.** To demonstrate that the AN/TRN-41 will meet the high temperature requirements of paragraphs 3.2.5.1.1 and 4.2.1.4.3.2 of Specification No. 404L-701-5017A, Part 1 of 2 parts (20 August 1976).

4. **Description of Test Article.** The AN/TRN-41 system consisting of the following was used for the high temperature tests:

Receiver-Transmitter	RT-1201/T
Antenna	AS-3132/T
Antenna Support	AB-1237/T
Filter, DC Power	F-1439/T
Interconnecting Cables	

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5. **Summary of Test Results.** The AN/TRN-41 showed no functional or physical degradation during the high temperature test.

6. **Description of Test Facilities and Procedures.** The test facilities and test procedures are described in Appendix IV-B of the Equipment Test Plan.

7. **Test Setup Diagrams.** The test setup diagrams are provided in Appendix IV-B of the Equipment Test Plan.

8. Test Equipment. See Attachment 1 for test equipment used for the high temperature test and the pre-test, test, and post-test operational tests.

9. Test Data Attachment 2 contains the data sheets for the high temperature test, pre-test, test, and post-test operational tests and the chamber data sheets.

10. Test Conditions. The system was conditioned at +71°C and then operated at +71°C.

11. Test results and Analysis. During the alarm test of the system at high temperature, the alarm circuitry failed to work. This was caused by the failure of integrated circuit 1A1U7. The integrated circuit was replaced and the high temperature test repeated. The system occasionally alarmed, but could be reset and all parameters checked during pre-test, test and post-test, operational tests. After the system was returned to room temperature, the RT was checked for the cause of the occasional alarms. These were caused by a selectable resistor 1A7R13 on the 6 dB Down Detector CCA (1A7) being selected for marginal operation. This was corrected by changing the value of the selectable resistor (from 180K to 220K) to provide proper operation. The system passed functional test and no physical degradation was observed by visual inspection.

12. Certification. The data sheets shown in Attachment 2 have been signed by a Montek Quality Assurance representative and a DCAS representative, certifying that the test results are authentic, accurate, current and in accordance with the related test plan.

ATTACHMENT 1

TEST EQUIPMENT

TEST EQUIPMENT

<u>Description/Manufacturer</u>	<u>Model</u>	<u>Calibration Due Date</u>
Oscilloscope, Tektronix	465	7/6/77
Signal Generator, RF, H.P.	612A	6/23/77
Peak Power Meter, HP	8900B	9/19/77
Pulse Generator, Data Pulse	110B	5/12/77
Counter, Fluke	1953	8/12/77
Half-Ampl. Det. Montek	131500-702	N/A
RF Detector, Montek	135203-100	N/A
Monitor Ant., Montek	006300	N/A
Test Box - Interconnection - Montek	131500-703	N/A
Power Supply HP	6274B	1/16/78
Power Supply Acopian		12/9/77
Power Supply, Sorensen	QR4075A	9/19/77
Directional Coupler 20 dB, Narda	3042B	N/A
Directional Coupler 10 dB, Microlab	CBA-78	N/A
Variable Attenuator, Weinschel 0-10 dB	905	N/A
RF Attenuator, Weinschel	10 dB	N/A
Multimeter, Fluke	8120A	8/2/77
Temperature Chamber, Tenney Engineering	27T100-350	
Temperature Recorder and Controller, Honeywell	15215-PS-295-111-91	9/9/77

ATTACHMENT 2

DATA SHEETS

APPENDIX IV-K
DATA SHEET
ENVIRONMENTAL TEST

131500-415

June 30, 1976

TEST HIGH TEMP.
SYSTEM 002

DATE from 4/28/77
to 5/2/77
ACCEPTABLE X
NOT ACCEPTABLE _____

REMARKS The system was subjected to high temperature tests as outlined by test
procedure 131500-415 appendix IV-B. At the conclusion of the high temperature testing
the data was reviewed and there was no degradation of performance observed. No
discrepancies were noted during the visual inspection.

DISCREPANCIES _____

SIGN OFF INFORMATION

ENVIRONMENTAL TEST ENGINEER _____ DATE _____

REPRESENTATIVE ENGINEER B G TAYLOR by J. M. Rogers DATE 5/2/77

QA REPRESENTATIVE m. B. Runt DATE 5/2/77

DCASD OR AF CONCURRENCE Will H. Runt DATE 5-2-77

June 30, 1976

DATA SHEET
OPERATIONAL TESTS
AN/TRN-41

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Test High TemperatureSystem 002

RT - 003

DC FUEL 004

AUT - 001

TRAD - 002

Date 4/30/77Time 9:10 AMTech W. T. H. 111

W. T. H. 111
DEAS

Para. No.	Description	Pre Test	5/2/77 12:30pm Test MAY	Post Test	Requirements	Units
6.1	Calibrated RF insertion loss $P_L = 32.5 \text{ dB}$ Used in determining all peak power.	N/A	N/A	N/A	N/A	N/A
6.2	System turn on normal operation	✓	✓	✓	Check if OK	N/A
6.3.1	Antenna radiated signal 15 Hz	✓	✓	✓	Check if OK	N/A
	135 Hz	✓	✓	✓	Check if OK	N/A
6.3.2	Antenna Speed	66.667	66.667	66.669	66.667 ± .133	ms
6.4.1.1	Correct identity code	✓	✓	✓	Check if OK	N/A
6.4.1.2	Identity period	38.0	37.0	37.0	37.5 ± 3.75	Seconds
6.4.2	Peak power (1) Reading of peak power meter $P_m = 70 \text{ mW}$ (2) Convert to dBm - 10 log $P_m \times 10^3 = P_m \text{ dBm}$ Total power output in dBm $P_{m \text{ dBm}} + P_L =$ *Insertion loss see 6.1 above.	70mW	80mW	73mW	N/A N/A 50 dBm	Watts dBm dB
6.4.3.3	Pulse count	7197	7279	7190	7200 ± 180	Counts
6.4.4.2	Pulse shape Width (50%) Rise time (10-90%) Fall time (90-10%)	3.4 2.0 2.4	3.4 2.0 2.4	3.4 2.0 2.4	3.5 ± 0.5 2 ± 0.25 2.5 ± 0.5	µs µs µs
6.4.4.4	Pulse spacing	12.0µs	12.0µs	12.0	12.0 ± 0.1	µs
6.4.5.2	Delay - 60 ± 10 µs 15 Hz trig to first burst pulse.	64µs ✓	64µs ✓	✓	Check if OK	

131500-415

June 30, 1976

DATA SHEET
OPERATIONAL TESTS
AN/TRN-41 (Continued)

BEST AVAILABLE COPY

Para. No.	Description	Pre Test	Test	Post Test	Requirements	Units
6.4.5.3	Correct north Burst - 12 pulse pairs spaced $30 \pm 0.1 \mu s$	✓	✓	✓	Check if OK	
6.4.5.5	Delay $60 \pm 10 \mu s$ - 135 Hz trig to first burst pulse	64 μs ✓	64 μs ✓	✓	Check if OK	
6.4.5.6	Correct Aux burst - 6 pulse pairs spaced $24 \pm 0.1 \mu s$	✓	✓	✓	Check if OK	
6.4.6.5	RT replies to 3300 interrogations	2755	2777	2765	≥ 2310 (Count)	Seconds
6.4.6.7	Demand only mode - time to switch from ON to STBY within 70 ⁸⁰ seconds	✓	✓	✓	Check if OK	
6.4.6.8	STBY mode	✓	✓	✓	Check if OK	
6.4.6.9	Demand Only mode - time to switch from STBY to ON 18 ²⁰ sec 4/19/77	✓	✓	✓	Check if OK	
6.4.6.10	ON AIR mode	✓	✓	✓	Check if OK	
6.4.7.1	DME ONLY mode	✓	✓	✓	Check if OK	
6.4.7.2	Switch from DME to TACAN	✓	✓	✓	Check if OK	
6.4.8.1	Antenna Alarm - Within four seconds	✓	✓	✓	Check if OK	
6.4.8.2	Alarm Reset	✓	✓	✓	Check if OK	
6.4.8.3	RT Alarm - Within five seconds	✓	✓	✓	Check if OK	
6.4.8.4	Alarm Reset	✓	✓	✓	Check if OK	

* THE SYSTEM OCCASIONALLY ALARMED WITH CHIMNEY DOOR CLOSED - HOWEVER EVERYTHING TESTED OK - THIS WAS TRUE FOR BOTH THE PRE AND THE POST TESTS. AFTER THE POST TESTS WAS RUN THE RT WAS OPENED UP. THE ALARM WAS DUE TO THE ^{LOW} NUMBER OF DETECTED PULSES BEING OUTPUT FROM THE ~~RT~~ A7CCA (GDS DOWN DETECTOR). TO CORRECT THIS A7R13 WAS CHANGED FROM A 180K TO A 220K [THIS IS A SELECTABLE RESISTOR AT TEST AND THE ORIGINAL RESISTOR VALUE (180K) WAS MARGINAL AND AFTER THE RT "AGED" DUE TO THE FIRST HIGH TEMP TEST THE DET. NOISE ^{PULSES} DROPPED BELOW THE ALARM LIMIT CAUSING THE PROBLEM] SINCE THE PROBLEM EXISTED BOTH BEFORE & AFTER THE 2ND HIGH TEMP TEST MONITOR FEELS THAT THE TEST WAS POSSED AND NEED NOT BE REPEATED. RAO

FACILITY:

T-3

ENVIRONMENTAL DATA SHEET ENVIRONMENTAL LABORATORY — DEPT. 330

A.O. 298K143	ENV. TECH.	TEST SCHED.
ENGINEER OR Q.C. (E Systems)	PHONE	TEST COMPLETED
TECHNICIAN	PHONE	TEST REMOVED
UNIT TITLE AN/TRN-41 (TACAN)	SER. 2	QTY. 1
TOTAL UTILIZATION		
INSTRUCTIONS TO OPERATOR	TEST TO TERMINATE:	BY:
HIGH Temp		
SPEC. E Sys 131500-415		
PAR. Appendix IV-A		
1977 DATE	TIME	CHRONOLOGICAL RECORD OF TEST
		INITIALS (PRINT)

1977 DATE	TIME	CHRONOLOGICAL RECORD OF TEST	INITIALS (PRINT)
4/26	11:30	Tacan installed into T-3. Perform functional pretest.	JCD
4/26	12:10	Set temp index to 160°F	JCD
4/28	15:10	" " " " 77°F	JCD
4/28	16:30	T-3 off	JCD
4/30	0945	T-3 on. Set temp index to 160°F	JCD
5/2	1250	T-3 off	JCD
5/3	1100	T-3 on. Set temp index to -85°F	JCD
5/3	1700	" " " " -65°F	JCD
5/4	0915	Cooling off. Set temp index to 0°F	JCD
5/4	0930	" " " " 70°F	JCD
5/4	1300	T-3 off	JCD
5/5	1100	T-3 on. Set temp index to -85°F	JCD
5/5	1730	" " " " -65°F	JCD
5/6	0930	" " " " +73°F	JCD
5/6	1100	T-3 off	JCD

VERIFIED & RELEASED BY:

Q.C. OR PROGRESS

COGNIZANT ENGINEER